

1. A method of generating a compressed video stream, comprising:

receiving a plurality of display commands; and

directly converting said commands into a compressed video stream, without first

generating a display raster.

2. A method of generating a compressed video stream, comprising:

receiving a plurality of display commands; and

directly converting said commands into said compressed video stream, wherein

said converting comprises motion estimation and wherein said motion estimation is

performed directly on said commands without first generating a display raster.

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3. A method of generating a compressed video stream, comprising:

receiving a plurality of display commands; and

directly converting said commands into said compressed video stream, wherein

said converting comprises change detection and wherein said change detection is

performed directly on said commands without first generating a display raster.

4. A method of motion estimation for image stream compression, comprising:

providing a plurality of display commands;

identifying display manipulation commands among said commands which
manipulation commands manipulate image portions in said image stream, said portions
being generated by other display commands among said plurality of display commands;

and

generating at least one motion vector, responsive to said identified display
manipulation commands.
5. A method according to claim 4, wherein said display manipulation commands
include a scroll command.
6. A method according to claim 4 or claim 5, wherein said display manipulation
command is generated as a direct result of a display of a downloaded image in a WWW
browser.
7. A method according to any of claims 4-5, comprising reducing a difficulty of said
motion vector generation by modifying said display manipulation commands.
8. A method according to claim 7, wherein scroll-type display modification
commands are limited to multiples of a compression block size dimension.

9. A method of change detection for image stream compression, comprising:

providing a plurality of display commands;

identifying commands of said plurality of commands which affect image portions
in said image stream;

identifying said image portions; and

determining if a change in one of said image portions requires image information
to be included in said image stream.
10. A method according to claim 9 wherein said determining comprises determining
if said change is greater than a change threshold.

11. A method of generating a compressed video stream, comprising:

providing a plurality of display commands;

directly setting values in a transform space, responsive to said display commands;

and

creating a compressed video stream utilizing said set values.
12. A method according to claim 11, wherein said transform space comprises a DCT space.
13. A method according to claim 11, wherein directly setting comprises utilizing transform coefficients from a look-up table.
14. A method according to claim 11, wherein directly setting comprises copying transform coefficients from a look-up table of transformed graphical primitives.
15. A method according to claim 11, wherein directly setting comprises copying transform coefficients from a cache of transformed image portions.
16. A method according to claim 11, wherein directly setting comprises rendering said display command into said transform space utilizing an analytical formula associating a graphical primitive defined by said display command with said transform space.

17. A method according to claim 11, comprising, modifying at least one of said display commands so that a graphical primitive defined by said at least one display command does not straddle an image block, for which block a set of transform coefficients are defined according to a compression protocol utilized by said compressed image stream.

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18. A method of generating a catalog, comprising:

providing a plurality of display elements;

generating a compressed video representation of each one of said elements; and

storing said compressed representations in a memory, indexed by element.

19. A method according to claim 18, wherein said display elements comprise GUI
(graphic user interface) objects.

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20. A method of generating a catalog, comprising:
- receiving, during interaction with an Internet a plurality of objects to be displayed;
- generating a compressed video representation of each one of said objects; and
- storing said compressed representations in a cache of objects, whereby when one of said objects is received again from said Internet at a later time, a earlier stored compressed representation is used for display generation.
21. A method according to claim 20, wherein said stored objects comprise at least one JPEG image.
22. A method according to claim 20, wherein said stored objects comprise at least one uncompressed image.
23. A method according to claim 20, wherein said stored objects comprise a WWW page.

24. A method of generating a compressed video stream, comprising:

generating a plurality of display commands which represents a display, by a
program;

modifying at least one of said display commands, independently of said program;

and

generating a compressed video stream utilizing said display commands.

25. A method according to claim 24, wherein said modifying comprises modifying
said commands to responsive to limitations of a display device on which said compressed
video stream is to be displayed.

26. A method according to claim 24, wherein modifying comprises modifying said
commands to reduce bandwidth requirements of said compressed video stream.

27. A method according to claim 24, wherein modifying comprises modifying said
commands to reduce resource requirements for compressing said compressed video
stream.

28. A method according to any of claims 24-27, wherein at least one of said display
commands represents an object and wherein said modifying comprises changing said at
least one display command such that the object is moved relative to its original display
position.

29. A method according to claim 28, wherein said compressed video stream comprises utilizes blocks having boundaries and wherein moving comprises moving said object to match at least one compression block boundary.

30. A method according to any of claims 24-27, wherein at least one of said display commands represents an object and wherein said modifying comprises replacing said object with a different object.

31. A method according to claim 30, wherein replacing said object comprises replacing said object with a compressed representation of said different object.

32. A method according to claim 30, wherein said object comprises a text object.

33. A method according to claim 30, wherein said object comprises a background of said display.

34. A method according to claim 30, comprising analyzing said object to determine a closest suitable replacement object.

35. A method according to any of claims 24-27, wherein modifying said object comprises changing a font definition for said object.

36. A method according to any of claims 24-27, wherein modifying said object comprises modifying at least one color of said object.

37. A method according to claim 36, wherein modifying a color comprises reducing a spatial resolution of said colors.

38. A method according to claim 36, wherein modifying a color comprises reducing a color range resolution of said colors.

39. A method according to any of claims 24-27, wherein modifying said object comprises reducing a spatial resolution of said object.

40. A method according to any of claims 24-27, wherein at least one of said display commands comprises a scrolling command and wherein said modifying comprises increasing a granularity of said scrolling.

41. A method according to claim 40, wherein said increasing a granularity comprises limiting said scrolling command to multiples of compression blocks size of said compressed stream.

42. A method of generating a compressed video stream, comprising:
generating a plurality of display commands which represents a display;
generating a plurality of transform coefficients from said display commands,
wherein said transform coefficients are quantized and wherein said quantization is
modified responsive to limitations a display device on which said compressed video
stream is to be displayed; and
creating a compressed video stream utilizing said coefficients.

43. A method according to claim 42, wherein said coefficients are quantized at a
lower resolution in a vertical direction of said display.

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44. A method of generating a compressed video stream, comprising:
providing a display definition including a compressed object; and
converting said display definition into a compressed video stream, wherein
converting includes transcribing at least a portion of said compressed object, without
decompressing said compressed object.
45. A method according to claim 44, wherein transcribing comprises reducing a
quality level of said compressed object.
46. A method according to claim 44 or claim 45, wherein said compressed stream and
said compressed object are compressed utilizing a same transform and wherein
transcribing comprises copying transform coefficients from said compressed object to
said compressed video stream.
47. A method according to claim 44 or claim 45, wherein said compressed stream and
said compressed object are compressed utilizing a motion estimation representation and
wherein transcribing comprises copying motion estimation vectors from said compressed
object to said compressed video stream.
48. A method according to claim 44 or claim 45, wherein converting said display
definition comprises directly converting said display representation into said compressed
video stream, without generating an intermediate image raster.

49. A method according to claim 44 or claim 45, wherein said compressed object comprises a second compressed video stream, covering only a portion of said display.

50. A method according to claim 44 or claim 45, wherein said compressed object comprises a compressed image, covering only a portion of said display.

51. A method according to claim 44 or claim 45, wherein said compressed object comprises a compressed audio stream.

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52. A method of image processing, comprising:
- providing an image to be compressed for transmission;
- simultaneously compressing and processing said image;
- transmitting said image to a remote location; and
- decompressing said processed image at said remote location.
53. A method according to claim 52, wherein said simultaneously compressing and processing comprises processing said image by modifying a quantization of at least one transform coefficient of said image.
54. A method according to claim 52, wherein said modifying comprises increasing a quantization granularity for vertical coefficients.

55. A method of generating a compressed video stream, comprising:
accumulating a plurality of display commands;
identifying at least one display command of said plurality, whose effect is mooted
by a later accumulated display command; and
converting said commands into said compressed video stream, ignoring the
mooted display command.

56. A method according to claim 55, wherein said mooted display command is
ignored if its effect on said compressed video stream, in view of said later command, is
below a threshold value.

57. A method according to claim 55, wherein converting said commands comprises
combining display commands.

58. A method according to any of claims 55-57, wherein said converting comprises
directly converting said commands into said compressed video stream without first
generating an image raster.

59. A method of video compression, comprising:

generating a display, which generation is refreshed at a generation refresh frame rate;

compressing, transmitting and decompressing said display; and

displaying said display at a second refresh rate other than said generation refresh rate and wherein said refresh is not synchronized to said display refresh rate.

60. A method according to claim 59, wherein said compressing is un-synchronized with said generation refresh frame rate.

61. A method according to claim 59, wherein said transmitting is un-synchronized with said compressing.

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62. A method of generating a compressed video stream, comprising:

generating a plurality of display commands;

accumulating at least one display command;

generating a compressed video stream from said accumulated display commands,

wherein accumulating comprises accumulating a number of display commands
responsive to instantaneous available resources.

63. A method of generating a compressed video stream, comprising:

generating a plurality of display commands;

accumulating at least one display command;

generating a compressed video stream from said accumulated display commands,

wherein accumulating comprises accumulating a number of display commands
responsive to a desired output frame rate.

64. A method according to claim 62 or claim 63, wherein generating a compressed
video stream is un-synchronized relative to said generation of display commands.

65. A method according to claim 64, wherein said display commands are generated in
sets, each set associated with a display frame and wherein said accumulating, in a single
accumulation set, display commands originating from different sets, wherein said single
accumulation set is utilized for generating a single frame of said compressed video
stream.

66. A method according to claim 62 or claim 63, comprising assigning a priority to a display command.

67. A method according to claim 66, comprising reordering said accumulated display commands, responsive to said priority, wherein generating a compressed video stream comprises generating a first frame in said compressed video stream utilizing an originally later display command, prior to generating a frame in said stream utilizing an originally earlier display command.

68. A method of generating a compressed video stream, comprising:

generating a plurality of display commands;

generating a compressed image portion responsive to said display commands; and

assembling a compressed video stream from said compressed image portion and
from at least one previously compressed image portion, created prior to generation of said
display commands.

69. A method according to claim 68, wherein said previously compressed image
portion comprises an image portion created for a previous image of said video stream.

70. A method of asynchronous video stream compression, comprising:
providing a first data source and a second data source;
converting said first data source into a first portion of a compressed video stream;
converting said second data source into a second portion of a compressed video stream; and

mixing said first portion and said second portions to create a single compressed video stream, wherein said first portion and said second portion temporally overlap in said single compressed video stream.

71. A method according to claim 70, wherein said first portion and said second portion utilize different frame rates.

72. A method according to claim 70, wherein said first portion and said second portion occupy different spatial areas in a display defined by said single compressed video stream.

73. A method according to any of claims 70-72, wherein said first and said second data sources comprise sets of display commands.

74. A method according to claim 73, wherein converting said first data source and converting said second data source comprises directly converting said data sources without generating an intermediate image raster.

75. A method according to any of claims 70-72, wherein at least one of said first data source and said second data source comprises an image source.

76. A method according to any of claims 70-72, wherein said first data source comprises a display portion affected by a command entered by a user who views said single compressed video source.

77. A method according to claim 76, comprising identifying portions of a data display which are affected by said user command.

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78. A method of generating a compressed video stream, comprising:
- executing a program, which program generates a set of display commands, representative of a display;
- identifying changes in said display which are responsive to at least one type of user command; and
- converting said display commands into a compressed video stream, wherein said changes are inserted into said compressed video stream at a higher frame rate than other changes in said display.
79. A method according to claim 78, wherein said type of user command comprises a pointing device command.
80. A method according to claim 78, wherein said changes comprises an indication of a selection of a GUI (graphical user interface) element.
81. A method according to any of claims 78-80, comprising analyzing said user command to determine display commands which effect said identified changes.

82. A method of display control, comprising:

transmitting a request, from a generator of a compressed video stream, to a source of display commands, which requests relates to said compression; and

modifying a generation of display commands, at said source, responsive to said request.

83. A method according to claim 82, wherein said source of display commands comprises a WWW browser.

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